

PATENT ABSTRACTS OF JAPAN

(11) Publication number : 2000-199197

(43) Date of publication of application : 18.07.2000

(51) Int. Cl. D21H 19/38
B41M 1/06

(21) Application number : 10-340790 (71) Applicant : NIPPON PAPER INDUSTRIES CO LTD

(22) Date of filing : 30.11.1998 (72) Inventor : NISHIJIMA EIJI
MATSUI TADAMI
OISHI MAYUMI
SEMI KATSUNORI
NANRI YASUTOKU

(30) Priority

Priority number : 10306734 Priority date : 28.10.1998 Priority country : JP

(54) PRODUCTION OF COATED PAPER FOR OFFSET PRINTING

(57) Abstract:

PROBLEM TO BE SOLVED: To produce a coated paper for offset printing excellent in operating efficiency at the time of undercoating and further excellent in opacity, print through, printed surface strength and developing properties of white paper glossiness.

SOLUTION: A needlelike or a light columnar calcium carbonate as a pigment component is wet pulverized to prepare an undercoating liquid containing the needlelike or the light columnar calcium carbonate after the pulverizing in an amount of 40 wt. % based on 100 wt. % of a pigment component and a base paper is then undercoated with the resultant undercoating liquid by a film transfer type coating device and further finish coated when producing a coated paper for offset printing by coating the base paper with the coating liquids comprising the pigment and an adhesive at least twice.

LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

BEST AVAILABLE COPY

[Patent number]

[Date of registration]

[Number of appeal against examiner's
decision of rejection]

[Date of requesting appeal against
examiner's decision of rejection]

[Date of extinction of right]

Copyright (C) ; 1998, 2000 Japanese Patent Office

* NOTICES *

The Japanese Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] In a manufacture of the application paper for offset printing which applies the application liquid containing a pigment and adhesives to stencil paper twice [at least] As a pigment component, carry out wet grinding of needlelike or the pillar-shaped precipitated calcium carbonate, and needlelike or the under coat application liquid which contains the pillar-shaped precipitated calcium carbonate 40% of the weight or more after trituration is prepared to 100 % of the weight of pigment components. The manufacture technique of the application paper for offset printing characterized by carrying out a finishing application after carrying out the under coat application of this under coat application liquid with the application equipment of a film transfer method at stencil paper.

[Claim 2] The manufacture technique of the application paper for offset printing according to claim 1 that the major axis after wet grinding of a needlelike or pillar-shaped precipitated calcium carbonate is characterized by a minor axis being 0.2-1.0 micrometers by 2.0-5.0 micrometers.

[Claim 3] The manufacture technique of the application paper for offset printing according to claim 1 or 2 characterized by being manufactured by carrying out a caustification by **** after the needlelike or pillar-shaped precipitated calcium carbonate carried out the slaking of the calcined lime with water or weak liquid at the chemical recovery process of the pulp manufacturing process by the sulphate-process soda method.

[Claim 4] The manufacture technique of the application paper for offset printing according to claim 1 to 3 characterized by the solid-content concentration of under coat application liquid being 42 - 50%.

[Claim 5] The manufacture technique of the application paper for offset printing according to claim 1 to 4 characterized by B type viscosity (30 degrees C, 60rpm) of under coat application liquid being 30 - 150mPa and s.

[Translation done.]

* NOTICES *

The Japanese Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the manufacture technique of the application paper for offset printing characterized by applying finishing application liquid, after applying under coat application liquid with the application equipment of a film transfer method in a manufacture of the application paper for offset printing which applies the application liquid which becomes stencil paper from a pigment and adhesives twice [at least].

[0002]

[Description of the Prior Art] The need in an aiming at advertisements [, such as a throwaway, a catalog, a pamphlet, and direct mail,] and advertisement commercial-in print sheet printing field is extended in recent years. Although the goods value of itself of these commercial printed matter is low, since it is important that the purpose is attained as an advertisement medium, it has been asked for the good thing of a printing result by the low cost. Especially, in the field of the catalog for mail orders, there is amendment of a postage etc. and the paper used for a cost cut is also going to lightweight-ization much more. However, since opacity and a printing strike-through pose a problem so that it lightweight-izes, it is asked for the paper with few printing strike-throughs with nearby quantity opacity by the low basis weight. Moreover, in the case of a throwaway and catalog intended use, since it will become problems (a claim, returned goods, etc.) if the color of printed matter and life is different, it is asked for the good paper of a high whiteness degree of color-reproduction nature.

[0003] As a means which generally raises opacity, there is technique, such as use of the use of loading materials (white carbon, pulverizing silica, etc.) with a big specific surface area, the loading material with a high refractive index, and pigments (titanium dioxide etc.), use of the pigments (a plastics pigment, ***** clay, etc.) which form a ***** coating layer, and an increase of use of a mechanical pulp. However, generally, these loading materials and a pigment have high price, and the viscosity of application liquid also tends to become high and they have a problem inferior to operation nature. Moreover, a whiteness degree is inferior when a mechanical pulp is used. Then, it is in the inclination that many technique of using the precipitated calcium carbonate which has a specific configuration (the shape of the shape of a cube and spindle, a column, needlelike grade) in consideration of a synthetic quality balance and operation nature for the loading material for **'s in stencil paper or the pigment for application liquid is especially adopted as lightweight application paper in recent years.

[0004] Moreover, since it corresponds to the need of the latest flourishing lightweight application paper like the above, it is also an important technical problem to raise a productivity by the paper manufacturer, with a high quality maintained, and to aim at a cost cut. Therefore, cheaper materials and a chemical are used and it is (1) improvement in the speed further. Formation of (2) double width Efforts to manufacture the product excellent in cost competitive strength by (3) online production-ized (integrated production from paper making to application and surface finish) (4) multilayer application-ization etc. are continued. Therefore, as a production facility, after carrying out the on-machine application of the under coat application liquid containing a cheap pigment by the film transfer method

at stencil paper, many methods which apply finishing application liquid are being adopted in recent years. In carrying out an under coat pigment application using film transfer application methods (a gate roll coater, a rod, or blade meta-ring coating machine) The trouble (phenomenon which the application liquid becomes mist-like and disperses at an application roll nip outlet), i.e., Myst, boiling (phenomenon of winning the foam by the application liquid pound of the roll nip inlet section which supplies application liquid) on operation peculiar to this method, Sublation pattern (the paper detached building by the application roll nip outlet is not stabilized) It is known that the problems which produce the field nonuniformity of the shape of a fixed pattern, such as a phenomenon and a gum rise (phenomenon of application liquid congealing and adhering to a roll front face with such shearing force between the rolls with which the diameter of a roll and peripheral speed are different), are shown in a paper front face.

[0005] From the above backgrounds, this invention person etc. sets to Japanese Patent Application No. 111591 [nine to]. a major axis by 3.0-5.0 micrometers The under coat pigment application liquid which contains the needlelike or pillar-shaped precipitated calcium carbonate in within the limits whose minor axis is 0.2-0.5 micrometers 60 to 90% of the weight in 100 % of the weight of pigment components After applying to a stencil paper front face by the film transfer method, the technique of improving the operation nature at the time of an under coat application, the opacity after a finishing application, a printing strike-through, a dry intensity, etc. was found out by carrying out a finishing pigment application. However, when the study was advanced further, the printing surface intensity of the multilayer application paper manufactured by this technique was hard to be called sufficient level, and the problem which is inferior in the manifestation nature of blank paper glossiness newly accepted.

[0006]

[Problem(s) to be Solved by the Invention] It is in the technical problem of this invention offering the application paper for offset printing which was excellent in the operation nature at the time of the under coat application which used the film transfer method, and was excellent in the low cost at opacity, a printing strike-through, a printing surface intensity, and blank paper glossiness manifestation nature in view of the above statuses.

[0007]

[Means for Solving the Problem] In a manufacture of the application paper for offset printing which applies the application liquid containing a pigment and adhesives to stencil paper twice [at least] as a result of this invention person's etc. repeating a research zealously about the above-mentioned technical problem As a pigment component, carry out wet grinding of needlelike or the pillar-shaped precipitated calcium carbonate, and needlelike or the under coat application liquid which contains the pillar-shaped precipitated calcium carbonate 40% of the weight or more after trituration is prepared to 100 % of the weight of pigment components. After carrying out the under coat application of this under coat application liquid with the application equipment of a film transfer method at stencil paper, it came to accomplish this invention by carrying out a finishing application. The detail of invention is shown below.

[0008] Generally a precipitated calcium carbonate, for example, which needlelike and pillar-shaped precipitated calcium carbonate compounded by the conventional carbon-dioxide-gas method, is lacking in hydrophilicity as compared with a whiting, and it is known that the application liquid which contained these as a pigment is inferior in a dynamic water retention. On the other hand, in the application paper manufacturing method of a film transfer method, when the case where the stencil paper by which a surface size is not carried out is used almost comes out and uses a precipitated calcium carbonate as a pigment for a certain reason, it is in the inclination that application liquid tends to sink into stencil paper in response to a strong pressure between rolls at the time of an application. For this reason, in consideration of the amount of adhesives which sinks into stencil paper, the amount of adhesives added by application liquid is determined. However, since the precipitated calcium carbonate in which a dynamic water retention is inferior in Japanese-Patent-Application-No. 111591 [nine to] news in order to improve the opacity of application paper was high-blended It was thought that the manifestation nature of the blank paper glossiness after a finishing application had also fallen by covering nature fall of stencil paper at the same time it became insufficient [the amount of adhesives] and the printing

surface intensity became inadequate as compared with the pigment used from the former, such as a pile cull as a result of application liquid's sinking into stencil paper too much.

[0009] Then, as a result of repeating a study further zealously, this invention etc. carried out wet grinding of needlelike as a pigment component, or the pillar-shaped precipitated calcium carbonate, and after having prepared the under coat application liquid which contains a pillar-shaped precipitated calcium carbonate 40% of the weight or more and carrying out the under coat application of this under coat application liquid with the application equipment of a film transfer method at stencil paper, it came to accomplish this invention needlelike [after trituration], or by carrying out a finishing application to 100 % of the weight of pigment components.

[0010] In this invention, the opacity of application paper, a printing strike-through, a printing surface intensity, and blank paper glossiness manifestation nature are improvable by using the precipitated calcium carbonate again pillar-shaped needlelike which carried out wet grinding as a pigment component of under coat application liquid. The thing with the large improvement effect of opacity and a printing strike-through Reach needlelike and a pillar-shaped precipitated calcium carbonate compares [above-mentioned] with the whiting of an indeterminate forms. If it is considered for promoting light scattering and it grinds still moderately by the configuration where it is low, and specific surface area is large, and a bulk density is characteristic, and the aragonite crystal, since specific surface area can be increased, maintaining the needlelike configuration before trituration to some extent As a result of promoting light scattering more than a pillar-shaped precipitated calcium carbonate, it is thought [needlelike / before trituration /, or] that the outstanding opacity can be discovered.

[0011] Moreover, it is thought of for discovering the outstanding stencil paper covering nature that the manifestation nature of a printing surface intensity and blank paper glossiness is improved at the same time it has prevented that the surface area of a pigment increases, the dynamic water retention of application liquid is improved sharply, application liquid sinks into stencil paper too much, and an under coat application layer becomes the shortage of adhesives by carrying out wet grinding of the needlelike or pillar-shaped precipitated calcium carbonate moderately. In addition, when the dynamic water retention in this invention shows the water retention of the application liquid in the status which the high shearing force during the roll which is rotating at high speed etc., and the hyperbaric-pressure force required and a dynamic water retention is inferior, application liquid will sink into stencil paper too much.

[0012] Moreover, the [the whiting average], when wet grinding of the needlelike or pillar-shaped precipitated calcium carbonate was carried out, B type viscosity of the pigment slurry [itself] was low, as compared with the application liquid which high-blended the needlelike or pillar-shaped non-ground precipitated calcium carbonate, the operation nature at the time of an under coat application could be maintained, and neither a boiling nor a sublation pattern was generated. It is thought that the needlelike or flocculation nature which a pillar-shaped precipitated calcium carbonate originally has will be improved when shearing force strong in a grinder is received although it now is not clear about a detailed device in to why the viscosity of a precipitated-calcium-carbonate pigment slurry falls by trituration, and a configuration breaks moderately, and grain will be for the dispersant added in a slurry while it is hard coming to condense to demonstrate an effect more re-. In addition, especially in this invention, the effect appeared notably above by 1100m/in application speed.

[0013] The amount of combination of the needlelike or pillar-shaped precipitated calcium carbonate used by this invention is 40 % of the weight or more to 100 % of the weight of all pigments. When the amount of combination becomes less than 40 % of the weight, opacity and a printing strike-through are inferior.

[0014] A major axis is [2.0-5.0 micrometers and the minor axis of the major axis and minor axis after wet grinding of the needlelike or pillar-shaped precipitated calcium carbonate used by this invention] 0.2-1.0 micrometers. The minor axis of the needlelike or pillar-shaped precipitated calcium carbonate after wet grinding is smaller than 0.2 micrometers, and since a particle diameter becomes [a major axis] small too much from 2.0 at a parvus case, it is not only in the inclination that a printing surface intensity (dry intensity) tends to fall, but the viscosity of application liquid becomes high too much, and it is in

the inclination which a boiling and a sublation pattern tend to generate. Moreover, a minor axis is larger than 1.0 micrometers, and when a major axis is larger than 5.0 micrometers, it is in the inclination that a particle diameter becomes large too much and blank paper glossiness tends to become low. Moreover, the needlelike or pillar-shaped precipitated calcium carbonate used by this invention is the chemical recovery process of the pulp manufacturing process by the sulphate process or the soda method, and after it carries out the slaking of the calcined lime with water or weak liquid, what was manufactured by carrying out a caustification by **** is desirable [a precipitated calcium carbonate]. The precipitated calcium carbonate by which this is manufactured at a chemical recovery process is the by-product of the white liquor (a caustic soda and sulfuration soda are a principal component) which is the main production, and is because it can manufacture by the low cost very much compared with the precipitated calcium carbonate obtained by the conventional carbon-dioxide-gas method. A configuration is controlled by controlling the following (1) slaking reaction and (2) caustification reaction.

$\text{CaO} + \text{H}_2\text{O} \rightarrow \text{calcium}2(\text{OH})$ (1):slaking reaction calcium (OH) 2+ $\text{Na}_2\text{CO}_3 \rightarrow \text{CaCO}_3 + 2\text{NaOH}$ As for (2):caustification reaction and the solid-content concentration of under coat pigment application liquid, it is desirable that it is 42 - 50% of within the limits. In exceeding 50%, it becomes easy to generate a boiling and a sublation pattern. Conversely, when lower than 42%, it is in the inclination which application liquid sinks into stencil paper too much, and is inferior in the shape of the front-face nature of application paper, and a field. Moreover, as for B type viscosity (30 degrees C, 60rpm) of under coat application liquid, it is desirable that they are 30 - 150mPa and s. When B type viscosity is lower than 30mPa.s, it is in the inclination which application liquid sinks into stencil paper too much, and is inferior in the shape of the front-face nature after an application, and a field. When higher than 150mPas and s, it is easy to tend generate a boiling and a sublation pattern.

[0015]

[Gestalt of operation of this invention] The precipitated calcium carbonate used by this invention is a needlelike or pillar-shaped precipitated calcium carbonate manufactured by the carbon-dioxide-gas method or the caustification method, wet grinding of these precipitated calcium carbonates is moderately carried out with grinders, such as a bead mill, and they are used. By grinding moderately, light-scattering nature and a dynamic water retention are improved further, and the outstanding opacity and outstanding stencil paper covering nature, a printing surface intensity, etc. are discovered.

[0016] The attritor very generally used for wet grinding of the pigment for paper manufacture as a grinder used by this invention, a vibration mill, a ball mill, a vertical-type sand mill, a horizontal-type sand mill, a jet mill, etc. are mentioned. Moreover, the spherical ball manufactured from hard raw materials, such as glass, a ceramic, an alumina, a zirconia, and a pebble, as a trituration media is mentioned, and, as for a particle diameter, it is desirable that it is 0.1-10mm. Since a motion of the media within a pulverization chamber will be restricted and an efficiency of comminution will be conversely reduced when a filling factor is too high, although the filling factor of a media has as high the desirable one as possible if an efficiency of comminution is taken into consideration, according to the grinder to use, it adjusts suitably. Moreover, the pigment used by this invention may not be specified other than the precipitated calcium carbonate of the above-mentioned publication, and may use together inorganic pigments, such as the whiting generally used as an object for paper manufacture, other precipitated calcium carbonates, a kaolin, clay, talc, a satin white, a silica, a titanium dioxide, a barium sulfate, a calcium sulfate, and a zinc oxide, and organic pigments, such as a plastics pigment.

[0017] Moreover, water-soluble naturally occurring polymers, such as the macromolecule synthesis latex whose adhesives used for application liquid by this invention are a styrene butadiene copolymer, a styrene butadiene acrylic copolymer, or its denaturation object, an oxidized starch, phosphate-ized starch, etherification starch, enzyme denaturation starch and cold-water fusibility starch, and a carboxymethyl cellulose, are used. The amount of combination of adhesives has desirable 5 - 30 weight section to the pigment 100 section.

[0018] Moreover, you may use the various assistants blended with the usual pigments for application papers, such as a dispersant, a thickener, a water retention agent, a defoaming agent, and a deck-watertight-luminaire-ized agent, for the application liquid of this invention.

[0019] Moreover, as stencil paper used by this invention, it is the basis weights 30-100g/the stencil paper of m2 used for the common application paper for printing, and paper of fine quality and a report grade paper are chosen for the purpose, and it is used.

[0020] Moreover, the application equipment of the film transfer method used for an under coat application can use a gate roll coater, a blade, or a ***** ring size press coating machine. A roll application type or fountain nozzle type blade coating machine is mainly used for a finishing application.

[0021] In addition, as for the amount of applications of under coat application liquid, it is desirable to apply in 2-8g/m2 by the solid content per one side of stencil paper. When applying an amount fewer than 2g/m2, a lowering colander is not obtained sharply but, as a result, the shape of stencil paper covering nature and a field tends to fall the limitation on equipment to pigment application liquid concentration. When applying more amounts than 8g/m2, while it is necessary to make pigment application liquid concentration high conversely and control of the amount of -ed [equipment glazing] becomes difficult in this case, it becomes easy to generate crepe-like a field dry area and a roll pattern on a paper front face.

[0022] 60 - 68% of the concentration of finishing application liquid is desirable, and, as for the amount of applications, 6-14g/m2 is usually desirable per one side at a solid content. In addition, in this invention, you may prepare a finishing application and an under coat application above much more, respectively.

[0023] As for the application paper by which application xeransis was carried out as mentioned above in finishing application liquid, gloss attachment is made as finishers, such as remaining as it is or a supercalender, and a soft calender, like usual.

[Example] Although an example is given to below and this invention is concretely shown in it, this invention does not receive a constraint at all by these. In addition, the section in an example and % show weight section and weight %, respectively.

A configuration and a minor axis, and the major-axis average were measured by the <quality evaluation technique> (1) precipitated-calcium-carbonate gestalt observation:scanning electron microscope (JEOL JSM-5300).

(2) According to blank paper glossiness:JIS P-8142, the specular gloss was measured 75 angles.

(3) According to JIS P-8138 and the A method, it measured using the opacity:brightness-by-Hunter meter.

(4) Using the printing strike-through:RI-II type printing machine (made in a dawn factory), as printing ink, using the TV mark V nu 617 (product made from Oriental ink), it was fixed the amount of 0.45 cc of ink, printed, and computed by the following formula according to JIS P-8123 using the brightness-by-Hunter meter.

[0024]

Using the rear-face whiteness-degree (5) dry on-the-strength:RI-II type printing machine (made in a dawn factory) of the whiteness-degree-printed matter of a printing strike-through (%) = blank paper, as printing ink, using TV-24 (product made from Oriental ink), it was fixed the amount of 0.35 cc of ink, and printed, and relative evaluation was visually made on the picking grade of a printing side.

[0025] O = -- O= which is not generated at all -- hardly generated x= occurrence of which **= occurrence is done made relative evaluation on the nonuniformity of the blank paper glossiness after a remarkable (6) blank-paper side-like:finishing application visually

[0026] O = -- O= without nonuniformity -- x= nonuniformity with **= nonuniformity which does not almost have nonuniformity judged the occurrence status of the sublation pattern of the space after a remarkable (7) sublation pattern:under coat application visually

[0027] O = -- O= which is not generated at all -- relative evaluation was visually made on the hardly generated occurrence status of the boiling at the time of the (8) boiling:under coat application with remarkable x= occurrence of which **= occurrence is done

[0028] O = -- O= which is not generated at all -- wet grinding of the needlelike precipitated calcium carbonate by which hardly generated x= occurrence of which **= occurrence is done was manufactured

in the caustification process of a remarkable [example 1] kraft pulp manufacturing process and whose minor axis a major axis is 0.6 micrometers in 6.0 micrometers was carried out so that a major axis might be set to 3.5 micrometers and a minor axis might be set to 0.5 micrometers using a bead mill To the needlelike precipitated-calcium-carbonate 50 section which performed trituration processing, and the pigment 100 section which blended the 50 sections of the whittings of 1.0 micrometers of mean particle diameters, the 0.3 sections of sodium-polyacrylate system dispersants were added, and it distributed in water using the cow loess disperser, and as adhesives, the phosphate-ized starch 20 section and the carboxy denaturation styrene butadiene copolymerization latex 5 section were blended, and under coat application liquid of 45% of solid-content concentration was prepared. B type viscosity of the under coat application liquid at this time was 83mPas and s.

[0029] Next, to the pigment which blended the whiting 60 section of 0.65 micrometers of mean particle diameters, and the kaolin 40 section, sodium-polyacrylate system dispersant 0.6 section addition was carried out, and it distributed in water using the cow loess disperser, and as adhesives, the phosphate-ized starch 6 section and the styrene butadiene system copolymerization latex 10 section were blended, and finishing pigment application liquid of 63% of solid-content concentration was prepared.

[0030] Furthermore, it finishing-applied by part for 1100m/in application speed, and dried so that a fountain blade coating machine might be used for finishing application liquid after under-coat-applying by part for 1300m/in application speed and drying so that 45g of basis weights/and m² may ******, a gate roll coater may be used for kraft pulp independent combination stencil paper for under coat application liquid and it may be set to 4g/m² by the solid content per one side, and it might be set to 8g/m² Finally 12 steps of supercalenders were used and gloss finishing was performed under processing speed a part for /and the conditions with a temperature of 80 degrees C of 700m.

Wet grinding of the needlelike precipitated calcium carbonate which was manufactured in the caustification process of a [example 2] kraft pulp manufacturing process and whose minor axis a major axis is 0.8 micrometers in 4.2 micrometers was carried out so that a major axis might be set to 3.1 micrometers and a minor axis might be set to 0.75 micrometers using a bead mill. According to the example 1, application paper was manufactured except having blended the 10 sections of the needlelike precipitated-calcium-carbonate 90 sections and the whittings of 1.0 micrometers of mean particle diameters which performed trituration processing, and having prepared under coat application liquid of 45% of concentration. B type viscosity of the under coat application liquid at this time was 89mPas and s.

According to the example 1, application paper was manufactured except having made concentration of [example 3] under coat application liquid into 40%. B type viscosity of the under coat application liquid at this time was 27mPas and s.

Wet grinding of the pillar-shaped precipitated calcium carbonate which was manufactured by the [example 4] carbon-dioxide-gas method and whose minor axis a major axis is 0.6 micrometers in 6.0 micrometers was carried out so that a major axis might be set to 3.5 micrometers and a minor axis might be set to 0.5 micrometers using a bead mill. According to the example 1, application paper was manufactured except having blended the 50 sections of the needlelike precipitated-calcium-carbonate 50 sections and the whittings of 1.0 micrometers of mean particle diameters which performed trituration processing, and having prepared under coat application liquid of 45% of solid-content concentration. B type viscosity of the under coat application liquid at this time was 100mPas and s.

According to the example 1, application paper was manufactured except having carried out wet grinding of the pillar-shaped precipitated calcium carbonate which was manufactured in the caustification process of a [example 5] kraft pulp manufacturing process and whose minor axis a major axis is 0.5 micrometers in 5.2 micrometers so that a major axis might be set to 4.3 micrometers and a minor axis might be set to 0.43 micrometers using a bead mill. B type viscosity of the under coat application liquid at this time was 73mPas and s.

Wet grinding of the needlelike precipitated calcium carbonate which was manufactured in the caustification process of the [example 1 of comparison] kraft pulp manufacturing process and whose minor axis a major axis is 0.6 micrometers in 6.0 micrometers was carried out so that a major axis might

be set to 3.5 micrometers and a minor axis might be set to 0.5 micrometers using a bead mill. According to the example 1, application paper was manufactured except having blended the 75 sections of the needlelike precipitated-calcium-carbonate 25 sections and the whittings of 1.0 micrometers of mean particle diameters which performed trituration processing. B type viscosity of the under coat application liquid at this time was 70mPas and s.

According to the example 1, application paper was manufactured except the major axis manufactured in the caustification process of the [example 2 of comparison] kraft pulp manufacturing process having used the needlelike precipitated calcium carbonate whose minor axis is 0.6 micrometers in 6.0 micrometers with processing in which it does not grind, and having prepared under coat application liquid of 40% of solid-content concentration. B type viscosity of the under coat application liquid at this time was 240mPas and s.

According to the example 1, application paper was manufactured except the major axis manufactured in the caustification process of the [example 3 of comparison] kraft pulp manufacturing process having used the needlelike precipitated calcium carbonate whose minor axis is 0.5 micrometers in 3.5 micrometers with processing in which it does not grind, and having prepared under coat application liquid of 45% of concentration. B type viscosity of the under coat application liquid at this time was 280mPas and s.

According to the example 1, application paper was manufactured except having ground the precipitated calcium carbonate of the indeterminate forms manufactured in the caustification process of the [example 4 of comparison] kraft pulp manufacturing process so that a mean particle diameter might be set to 1.0 micrometers using a bead mill. B type viscosity of the under coat application liquid at this time was 60mPas and s.

[0031] The above result was shown in Table 1 and 2.

[0032]

[Table 1]

表1

	実施例				
	1	2	3	4*	5
軽カル形状	針状	針状	針状	針状	柱状
粉碎前長径 (μ m)	6.0	4.2	6.0	6.0	5.2
粉碎前短径 (μ m)	0.6	0.8	0.6	0.6	0.5
粉碎後長径 (μ m)	3.5	3.1	3.5	3.5	4.0
粉碎後短径 (μ m)	0.5	0.75	0.5	0.5	0.43
下塗り塗被液顔料組成					
軽カル配合部数 (部)	50	90	50	50	50
重カル配合部数 (部)	50	10	50	50	50
下塗り塗被液濃度 (%)	45	45	40	45	45
B型粘度 (mPa·s)	83	89	27	100	73
白紙光沢度 (%)	65	66	64	65	65
不透明度 (%)	88	89	88	89	89
印刷裏抜け (%)	9.5	9.4	9.6	9.2	9.3
ドライ強度	◎	◎	○	○	◎
白紙面状	◎	◎	○	◎	◎
剥離パターン発生状況	◎	◎	◎	○	◎
ボイリング発生状況	◎	◎	◎	○	◎

* : 炭酸ガス法を使用。

[0033]

[Table 2]

表2

	比較例			
	1	2*	3*	4
軽カル形状	針状	針状	針状	不定形
粉碎前長径 (μm)	6.0	6.0	3.5	—
粉碎前短径 (μm)	0.6	0.6	0.5	—
粉碎後長径 (μm)	3.5	—	—	—
粉碎後短径 (μm)	0.5	—	—	—
下塗り塗被液顔料組成				
軽カル配合部数 (部)	25	50	50	50
重カル配合部数 (部)	75	50	50	50
下塗り塗被液濃度 (%)	45	40	40	45
B型粘度 (mPa·s)	70	240	280	60
白紙光沢度 (%)	65	80	59	64
不透明度 (%)	85	88	89	83
印刷裏抜け (%)	12.6	9.8	9.3	14.0
ドライ強度	◎	×	×	◎
白紙面状	◎	×	×	○
剥離パターン発生状況	◎	△	×	◎
ボイリング発生状況	◎	△	×	◎

* : 未粉碎のまま使用。

Examples 1-5 are excellent in opacity, a printing strike-through, and a printing surface intensity, and its blank paper glossiness is also high and they are excellent in the shape of a blank paper side so that clearly from Table 1 and 2. Moreover, the operation nature at the time of an under coat application is also satisfactory at all. On the other hand, the example 1 of a comparison is inferior in opacity and a printing strike-through. The examples 2 and 3 of a comparison have low blank paper glossiness, a dry intensity is inferior in them, its occurrence of a sublation pattern and a boiling is remarkable, and they are inferior in the shape of a blank paper side. The example 4 of a comparison is inferior in opacity and a printing strike-through.

[0034] Therefore, the application paper for offset printing manufactured by this invention gives the outstanding application paper quality which is not in the former, and some which become size extremely have the effect.

[0035]

[Effect of the Invention] The application paper for offset printing which was excellent in the operation nature at the time of an under coat application, and was excellent in opacity, a printing strike-through, a printing surface intensity, and blank paper glossiness manifestation nature can be offered.

[Translation done.]

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- BLACK BORDERS**
- IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- FADED TEXT OR DRAWING**
- BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- SKEWED/SLANTED IMAGES**
- COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- GRAY SCALE DOCUMENTS**
- LINES OR MARKS ON ORIGINAL DOCUMENT**
- REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.